

UTC Project Information	
Project Title	MPC-364 – Do Changing Prices Portend a Shift in Fuel Consumption, Diminished Greenhouse Gas Emissions, and Lower Fuel Tax Revenue?
University	Utah State University
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Project Cost	\$200,000
Start and End Dates	January 1, 2012 – December 31, 2013
Project Duration	2 Years
Brief Description of Research Project	<p>New drilling and recovery techniques have resulted in a dramatic increase in the amount of recoverable natural gas and a consequent decrease in natural gas prices. Because natural gas can substitute for some uses of oil and gasoline it raises the possibility that rising petroleum prices may not diminish VMT to the degree assumed by some models. The proposed research would include the following tasks:</p> <ul style="list-style-type: none"> • Document the increased availability of natural gas for transportation in Washington. • Assess the extent to which natural gas is likely to substitute for petroleum (in particular the extent to which natural gas substitutes for petroleum as a transportation fuel). • Estimate the extent that price and performance effects will influence VMT trends in Washington State. • Estimate changes in GHG emissions in Washington State that would result from increased use of natural gas as a direct transportation fuel. GHG emissions associated with natural gas used in power generation to support EVs and PHEVs will also be estimated. • Estimate potential loss of fuel tax revenue attributable to substitution of natural gas and electricity for petroleum fuels.

<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>This report evaluates the economic competitiveness of natural gas as a transportation fuel and estimates the extent to which natural gas is likely to substitute for petroleum as a transportation fuel. Additionally, the potential impacts of natural gas vehicle adoption on vehicle miles traveled, greenhouse gas emissions (CO₂) and fuel tax revenue have been assessed.</p> <p>Natural gas enjoys a per-BTU cost advantage over petroleum and this price advantage is likely to persist into the foreseeable future. New low-cost extraction technology (hydraulic fracturing or “fracking”) has increased the supply of domestic natural gas while petroleum prices have increased. Expert opinion suggests this price difference is likely to persist and that natural gas in the United States will enjoy a price advantage over petroleum for many years.</p> <p>Despite the per-BTU cost advantage enjoyed by natural gas relative to gasoline, as a transportation fuel natural gas faces some substantial disadvantages. In addition to competition from other alternative fuels, widespread adoption of natural gas vehicles would require substantial investment in fueling infrastructure. Very few natural gas vehicles are available directly to consumers from manufacturers and those vehicles that are available are more expensive and suffer from several other disadvantages. For example, because natural gas is less energy dense, NGVs are typically less powerful, heavier, have less storage/trunk space, and have more limited range due. Despite the fuel cost savings, these disadvantages and the additional cost tend to make natural gas vehicles an uneconomical choice for most consumers. Models of consumer preference suggest that a substantial decrease in the price of natural gas vehicles would be necessary to induce a notable increase in light-duty NGVs adoption rates. However, natural gas may represent an attractive alternative for a substantial portion of the heavy-duty vehicle fleet and there is evidence of increasing adoption rates in this sector.</p> <p>These estimates suggest that natural gas vehicle adoption is unlikely to substantially affect VMT in Washington State. Additionally, VMT is more highly sensitive to variables that are correlated with overall population size (the number of registered vehicles and total employment) than to fuel prices. Although per-capita VMT has been declining in recent years, aggregate VMT in Washington State has been increasing steadily due to increased population. Higher fuel prices do have a negative effect on VMT although the estimated elasticity is relatively low. Finally, the adoption of natural gas vehicles is unlikely to have a substantial effect on VMT.</p>
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<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>The growing uncertainty about oil prices and availability has made long-range transportation planning more challenging. Rather than relying on trend extrapolation, this study used market mechanisms to evaluate key long-range transportation planning assumptions. Although the Washington Department of Transportation (WSDOT) is currently pursuing alternative fuels and energy sources, this study focused primarily on natural gas. In particular, this study will help WSDOT assess the likelihood natural gas will substitute for petroleum fuels and estimate the impact changes in fuel prices will have on travel demand, fuel consumption, emissions, and tax revenues.</p> <p>The results of the modeling show that the impacts of Natural Gas Vehicles (NGV) have the potential to effect vehicle miles traveled (VMT), emissions, and fuel tax revenue. The effects of NGVs are muted by the limited use of them in the fleet. Challenges with widespread integration include the increased upfront capital costs associated with NGVs, decreased power for heavy vehicles, and range anxiety in locations without developed natural gas fueling infrastructure. The NGV market in the state of Washington is hampered by these factors. The modeling and analysis in this report can be used to analyze changing conditions in the market and the effects on key transportation metrics.</p>
<p>Web Links</p> <ul style="list-style-type: none"> • Reports • Project Website 	<p>https://www.ugpti.org/resources/reports/details.php?id=786</p>